



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,517	12/30/2003	Brett Allen Boutwell	127084 (GEAE-0037-UTY)	7276
49305	7590	10/07/2005	EXAMINER	
JAGTIANI + GUTTAG 10363-A DEMOCRACY LANE FAIRFAX, VA 22030			MCNEIL, JENNIFER C	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 10/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/748,517

Applicant(s)

BOUTWELL ET AL.

Examiner

Jennifer C. McNeil

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/7/05, 08/31/05.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 9-15 and 20-25 is/are rejected.
- 7) ☒ Claim(s) 5-8 and 16-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 9, 23, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhu et al (US 6,812,176). Zhu teaches a thermal barrier coating for a turbine engine blade. The coating comprises zirconia stabilized with a primary stabilizer, and also contains a Group A and Group B dopant. The primary stabilizer may be yttria, and may be present in an amount of 2-25 mol%. The Group A dopant may be a rare earth oxide (such as lanthana) or a transition metal oxide (such as tantala), and may be present in an amount of 0.5-25 mol%. The Group B dopant may comprise neodymia and be present in an amount of 0.5-25 mol%. Each of these ranges overlaps with that of the instant claims. Specifically, the first metal oxide of the instant claims may be neodymia (Group B dopant), the second metal oxide of the instant claims may be yttria (primary stabilizer), the third metal oxide may be tantala (Group A dopant). Tantala is specifically mentioned as a Group A dopant (claim 2 of Zhu). Regarding claim 3, the base oxide may be a combination of zirconia and hafnia, in an amount from 46-97 mol% (10 mol% hafnia, 80 mol% zirconia, 10 mol% stabilizer, for example). Regarding claim 25, the method of deposition is not considered a limitation that structurally defines over the prior art.

Art Unit: 1775

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 9, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhu et al (US 6,812,176). Zhu teaches a thermal barrier coating as discussed above, and gives overlapping ranges of oxide concentrations. While Zhu does not give specific examples of oxides within these ranges, one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the compositional proportions taught by Zhu overlap the instantly claimed proportions and therefore are considered to establish a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges including the instantly claimed ranges from the ranges disclosed in the prior art reference, particularly in view of the fact that;

“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages”, In re Peterson 65 USPQ2d 1379 (CAFC 2003).

Also, In re Geisler 43 USPQ2d 1365 (Fed. Cir. 1997); In re Woodruff, 16 USPQ2d 1934 (CCPA 1976); In re Malagari, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

Regarding claim 25, the method of deposition is not considered a limitation that structurally defines over the prior art.

Art Unit: 1775

Claims 10-15, 20-22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhu et al (US 6,812,176) in view of Rickerby et al (US 6,025,078). Zhu teaches a thermal barrier coating as discussed above, and specifies its use for turbine blades. Zhu does not give a specific substrate or bond coating for the turbine blade. Rickerby teaches a zirconia based thermal barrier coating similar to that of Zhu which is used for turbine blades. Rickerby teaches a metal substrate and multiple types of bond coatings that may be used to improve the adhesion of the zirconia coating to the underlying substrate. One of ordinary skill would have found it obvious to use a bond coating to adhere the zirconia based thermal barrier of Zhu to an underlying substrate in a manner similar to that of Rickerby, as they both are coatings for turbine engine blades and have similar compositions. Regarding claims 17 and 18, the lanthana is not considered to be positively recited as a component of the claim. In other words, the option of neodymia is considered the option of the first metal oxide. The phrase "is included in the mixtures" is not considered to mean that the first oxide is either a mixture of neodymia or ytterbia and lanthana.

Regarding the thickness of the layers, one of ordinary skill would have found it obvious to provide the layers with a thickness sufficient to provide protection to the underlying substrate from the corrosive turbine environment.

Allowable Subject Matter

Claims 5-8, and 16-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 1775

Response to Arguments

Applicant's arguments with respect to claims 1-25 have been considered but are not persuasive.

Applicant argues that Zhu does not specify which in phase the zirconia is stabilized by the oxide additions. It is well known in the art of zirconia coatings and bodies that the addition of oxides such as yttria, hafnia, calcia, magnesia, and a host of other oxides are used to stabilize the zirconia.

As recited in US 4,639,356 O'toole),

"Stabilized zirconias" result from the addition of enough of these other oxides to form a solid solution with the cubic fluorite structure. Partially stabilized zirconias contain less additives than stabilized zirconia resulting in monoclinic or tetragonal phase zirconia exclusively or as precipitates in the mixed oxide cubic fluorite solid solution."

As taken from US 4,485,151 to Stecura,

"Partially-stabilized zirconia consists of mixtures of cubic, tetragonal, and monoclinic phases."

As disclosed in US 4,360,598 to Otagiri,

"There have hitherto been known as ZrO_2 - Y_2O_3 zirconia ceramics, fully stabilized zirconia ceramics consisting only of cubic phase and partially stabilized zirconia ceramics consisting of cubic phase and monoclinic phase..."

As taken from US 3,620,781 to Garvie,

"Zirconia is thermally unstable in that it undergoes a reversible polymorphic transformation from monoclinic to tetragonal structure in the range of about 900-1200 degrees Celsius, which is accompanied by a relatively large volume change (about 7-9 percent) that commonly causes fracturing and disintegration of a body made of such material. As a result, certain additives (or stabilizers) forming thermally stable cubic solid solutions and/or compounds with zirconia have been mixed and reacted with zirconia to overcome the disastrous volume change. Exemplary of such additives is calcia. Bodies are either wholly or partially stabilized depending upon whether the amount of additive is sufficient to react and form the cubic phase with all or part of the monoclinic-tetragonal zirconia crystals."

From these disclosures it is clear that the additives used by Zhu would result in stabilizing the zirconia. Even if the amounts added by Zhu do not provide a "fully" stabilized zirconia, even partial stabilization results in some cubic phase.

Art Unit: 1775

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer C. McNeil whose telephone number is 571-272-1540. The examiner can normally be reached on 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jennifer McNeil
October 2, 2005